

## First record of *Gymnogeophagus lipokarenos* Malabarba, Malabarba & Reis, 2015 (Teleostei: Cichliformes) from Argentina.

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### Abstract

*Gymnogeophagus lipokarenos* is registered for the first time from Argentina in the Province of Misiones. The species was originally described as endemic to the Upper Uruguay freshwater ecoregion in Brazil. Our findings extend its distribution into the Lower Uruguay ecoregion throughout the province of Misiones.

### Introduction

The genus *Gymnogeophagus* inhabits the La Plata basin, Laguna dos Patos system, and rio Tramandaí basin, plus a single record of *G. balzanii* is from the rio Guaporé in the Amazon basin (Malabarba et al., 2015; Loureiro et al., 2016). *Gymnogeophagus* is currently diagnosed by the presence of a forward directed spine on the top of the first dorsal pterygiophore and the loss of bony supraneurals (Reis & Malabarba, 1988). The species of this genus show two reproductive strategies: substrate brooding and mouth brooding. The later one is present in species which are informally known as the "*G. gymnogenys* species group". Two years ago, Malabarba et al. (2015) described five new species belonging to this species group from the freshwaters of Brazil and Uruguay, among them *G. lipokarenos*. The aim of this contribution is to register this species for the first time for Argentina, from the río Uruguay basin in Misiones.

### Examined material

*Gymnogeophagus lipokarenos* (figs. 1-4, 7): all lots from Argentina, Misiones province, Uruguay river basin: MLP 11251, 2 exs., 82,7-86,2 mm SL, arroyo Paraiso (27°2'52,49"S 54°5'54,97"W) 22.11.2016 (fig. 1-2). MLP 11252, 3 exs., 116,3-127,0 mm SL, lower arroyo Paraiso (27°9'26,58"S 54°4'0,46"W) 24.11.2016. MLP 11253, 4 exs., 72,8-127,4 mm SL, arroyo Guerrero (arroyo López) (27°45'57,4"S 55°09'33,7"W), 03.12.2007 (fig. 3). MLP 11254, 2 exs., 80,0-87,3 mm SL, arroyo Fortaleza (26°45'56,6"S 54°10'57,4"W), 01.12.2007. MLP 11255, 5 exs., 61,8-87,2 mm SL, arroyo Shangai (27°28'13,8"S 54°41'24,5"W). MACN-Ict 12306, 6 exs., 61,6-94,5 mm SL, arroyo El Saltito, Salto Golondrinas (27°7'50,34"S 54°29'22,54"W) 23.11.2016 (fig. 4). MACN-Ict 12304, 2 exs., 103,8-117,0 mm SL, arroyo El Saltito, Salto Caracol (27°9'27,40"S 54°38'19,53"W), 25.11.2016. MACN-Ict 12305, 1 ex., 133,7 mm SL, arroyo Toro (26°36'32,8"S 53°44'13,9"W), 10.12.2014. IBIGEO-I 448, 5 exs., 88,0-118,6 mm SL, arroyo Toro (26°36'32,8" S, 53°44'13,9" W), 01.12.2016. IBIGEO-I 450, arroyo Melo (27°25'2,67"S 54°42'7,93"W), 13.11.2016 (fig. 7). CI-FML 7264, 4 ex., 39,2-108,8 SL, same collecting data as previous lot.



fig. 1. *Gymnogeophagus lipokarenos*, MLP 11251, arroyo Paraiso

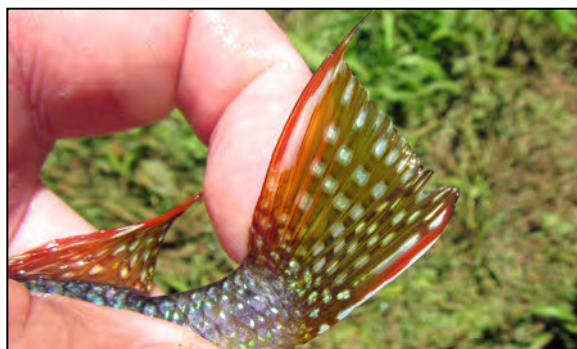


fig. 2. *Gymnogeophagus lipokarenos*, MLP 11251, arroyo Paraiso, close up of color of caudal fin



fig. 3. *Gymnogeophagus lipokarenos*, MLP 11253, arroyo Guerrero



fig. 4. *Gymnogeophagus lipokarenos*, MACN-Ict 12306, arroyo El Saltito, Salto Golondrinas



fig. 5. Arroyo Fortaleza, middle Uruguay basin

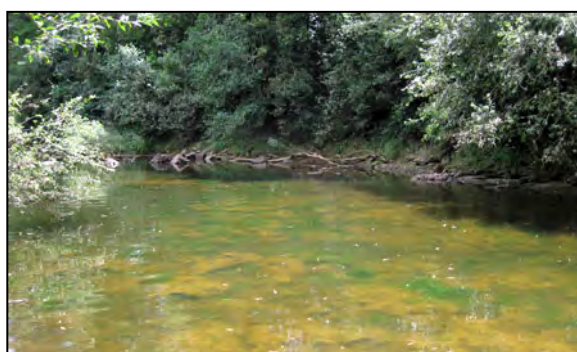


fig. 6. Arroyo Toro, upper Uruguay basin

## Distribution

*Gymnogeophagus lipokarenos* is widely distributed in the Upper río Uruguay basin and has been described as endemic to this section of the river basin (Malabarba et al., 2015). However, some paratypes have been included in the original description (Malabarba et al., 2015) which were collected in the Middle río Uruguay basin (*sensu* Zaniboni Filho & Schulz; 2003; Lower Uruguay *sensu* Abell et al. (2008) in Brazil. Here we extend the distribution of the species to tributaries of both the Upper and Middle río Uruguay basin throughout Misiones, Argentina (fig. 9). The Middle Uruguay and Lower Uruguay *sensu* Zaniboni Filho & Schulz (2003) correspond to the Lower Uruguay Freshwater ecoregion *sensu* Abell et al. (2008).

## Habitat

All the above listed specimens of *Gymnogeophagus lipokarenos* have been captured in environments with clear to slightly turbid water and flat slab-like exposed rocky bottoms or above gravel (figs. 5-6 and 8).



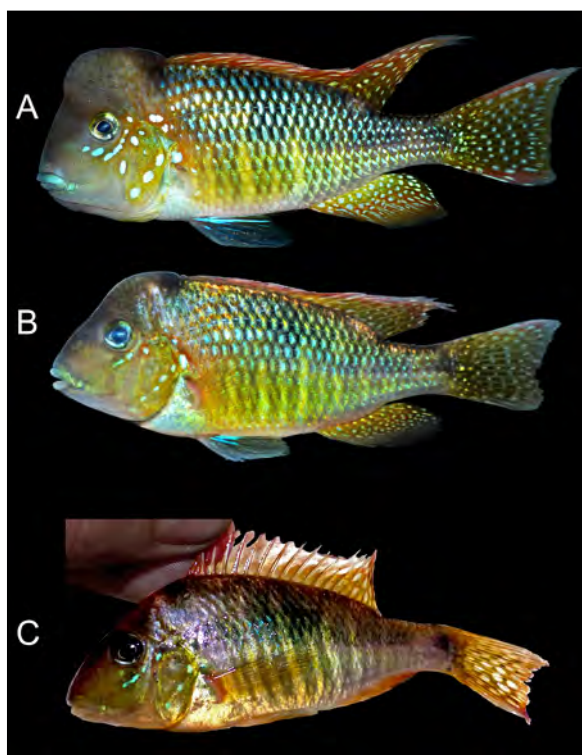


fig. 7. *Gymnogeophagus lipokarenos*, arroyo Melo.  
A (CI-FML 7264) and B: males (IBIGEO-I 450),  
C: female (IBIGEO-I 450)

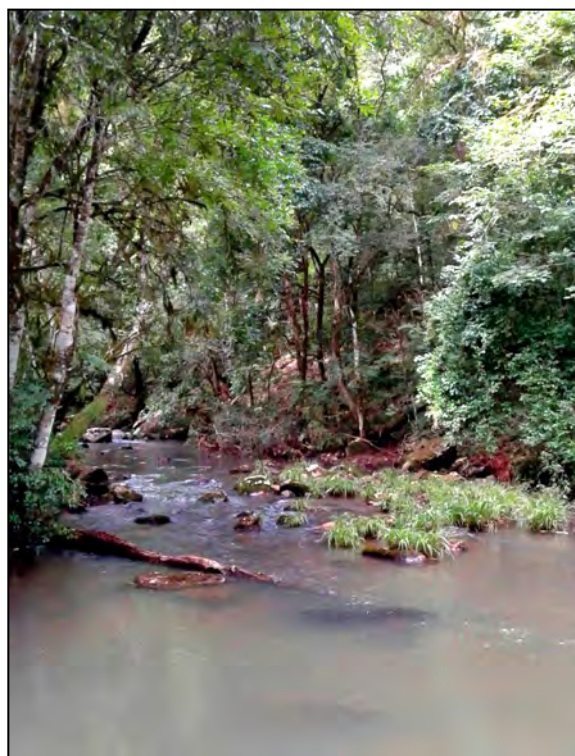


fig. 8. Arroyo Melo, middle Uruguay basin

### Remarks

The specimens of *G. lipokarenos* were identified following Malabarba et al. (2015). This species is diagnosed by a bright yellow color background on the unpaired fins, and the presence of white dots aligned between rays with the distal border of dorsal fin and dorsal and ventral contours of caudal fin red with white stripes and dots. The contrasting bright yellow and red coloration in unpaired fins is well observed in the specimens analyzed herein (figs. 1-4 and 7). Contrary to the holotype's photo and the original description that states that this species possesses a "lateroventral color bluish white", most of the adult male specimens analyzed herein have a yellow ventral half of the body (figs. 1-3 and 7) instead of bluish white (fig. 4). Both color morphs (yellow or blue) are however found in our material and were even collected syntopically (e.g. at Salto Caracol, arroyo El Saltito). These two color morphs may represent different reproductive or territorial strategies as it is known from other cichlid species, as in *Astatotilapia burtoni*, for example (Korzan & Fernald, 2006). Further studies involving manipulatory experiments would be of much interest to understand if these color morphs are involved in behavioral aspects of this species, if these differences are plastic, if they are reversible or if these are inherited and not environmentally affected.

Malabarba et al. (2015) described *G. lipokarenos* as endemic to the Upper Uruguay Ecoregion (Abell et al., 2008). Our records from Misiones, Argentina, show that *G. lipokarenos* is distributed in both the Upper and the Lower Uruguay Ecoregions (Abell et al., 2008; Hales & Petry, 2015). The distribution of *G. lipokarenos* in Misiones (fig. 9) reaches all the way South to the latitude from where *G. constellatus* Malabarba et al., 2015 and *G. missioneiro* Malabarba et al., 2015 are known. These species however are only known from left bank tributaries of the Uruguay river in Brazil and have so far not been collected from the right bank affluents of the río Uruguay in Argentina.

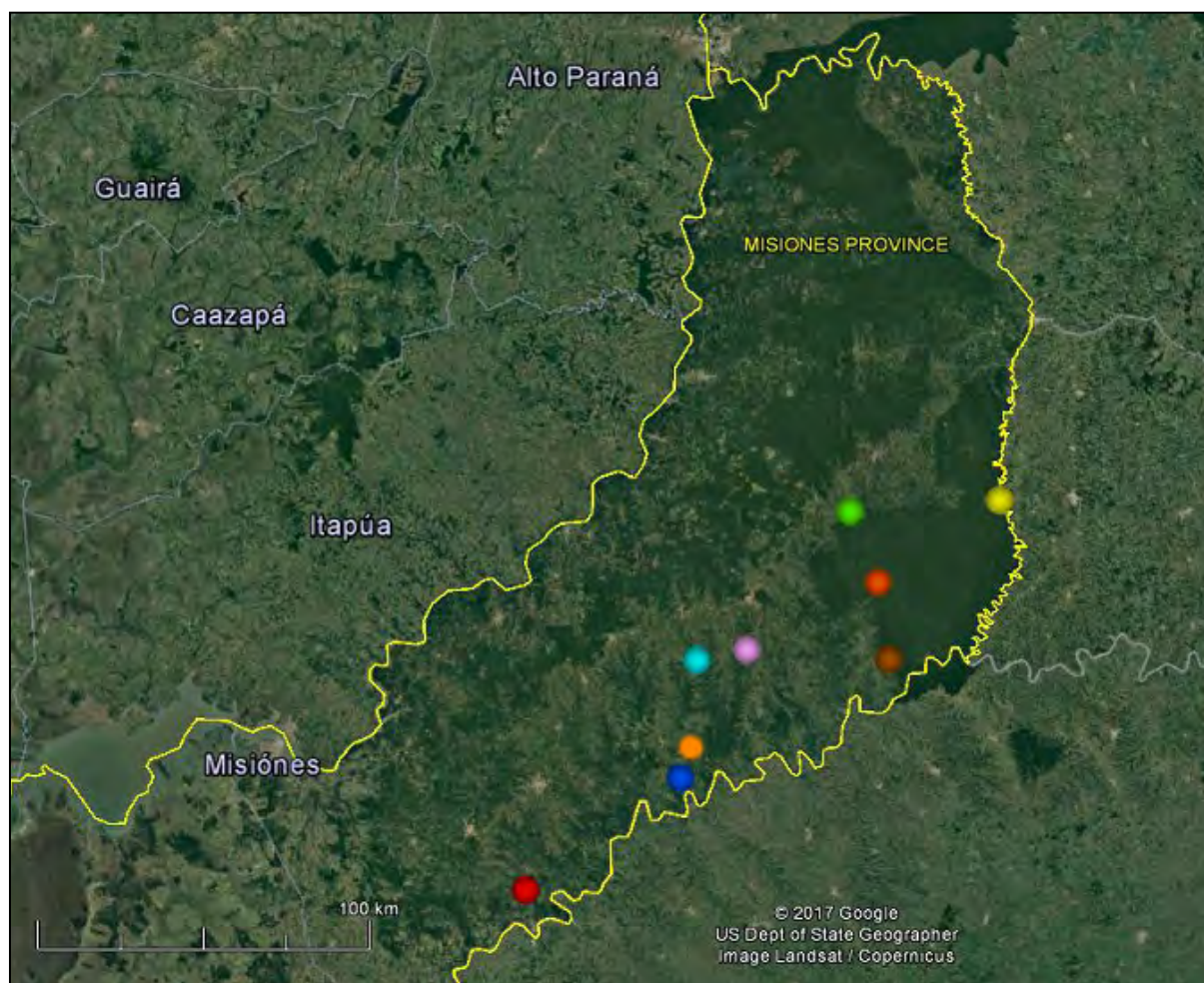


fig. 9. Collecting sites of *Gymnogeophagus lipokarenos* in Argentina: yellow: arroyo Toro, red: arroyo Guerrero, green: arroyo Fortaleza, light blue: arroyo El Saltito, Salto Caracol; pink: arroyo El Saltito, Salto Golondrinas; brown: arroyo Paraiso; Brown: lower arroyo Paraiso; orange: Arroyo Melo, and blue: arroyo Shangai

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